COURSE OUTCOMES FOR R16 REGULATION

II YEAR

MA301BS: MATHEMATICS – IV

- Analyze the complex functions with reference to their analyticity, integration using Cauchy's integral theorem
- Find the Taylor's and Laurent's series expansion of complex functions
- The bilinear transformation
- Express any periodic function in term of sines and cosines
- Express a non-periodic function as integral representation
- Analyze one dimensional wave and heat equation

CS302ES: DATA STRUCTURES THROUGH C++

- Ability to choose appropriate data structures to represent data items in real world problems.
- Ability to analyze the time and space complexities of algorithms.
- Ability to design programs using a variety of data structures such as stacks, queues, hash tables, binary trees, search trees, heaps, graphs, and B-trees.
- Able to analyze and implement various kinds of searching and sorting techniques.

CS303ES: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

- Ability to apply mathematical logic to solve problems.
- Understand sets, relations, functions, and discrete structures.
- Able to use logical notation to define and reason about fundamental mathematical concepts such as sets, relations, and functions.
- Able to formulate problems and solve recurrence relations.
- Able to model and solve real-world problems using graphs and trees.

CS304ES: DIGITAL LOGIC DESIGN

- Able to understand number systems and codes.
- Able to solve Boolean expressions using Minimization methods.
- Able to design the sequential and combinational circuits.
- Able to apply state reduction methods to solve sequential circuits.

CS305ES: OBJECT ORIENTED PROGRAMMING THROUGH JAVA

- Able to solve real world problems using OOP techniques.
- Able to understand the use of abstract classes.
- Able to solve problems using java collection framework and I/o classes.
- Able to develop multithreaded applications with synchronization.
- Able to develop applets for web applications.
- Able to design GUI based applications

CS306ES: DATA STRUCTURES THROUGH C++ LAB

- Able to identify the appropriate data structures and algorithms for solving real world problems.
- Able to implement various kinds of searching and sorting techniques.
- Able to implement data structures such as stacks, queues, Search trees, and hash tables to solve various computing problems.

CS307ES: IT WORKSHOP

- Apply knowledge for computer assembling and software installation.
- Ability how to solve the trouble shooting problems.
- Apply the tools for preparation of PPT, Documentation and budget sheet etc.

CS308ES: OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

- Able to write programs for solving real world problems using java collection frame work.
- Able to write programs using abstract classes.
- Able to write multithreaded programs.
- Able to write GUI programs using swing controls in Java.

MC300ES: ENVIRONMENTAL SCIENCE AND TECHNOLOGY

Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development

CS401ES: COMPUTER ORGANIZATION

- Able to understand the basic components and the design of CPU, ALU and Contr**ol** Unit.
- Ability to understand memory hierarchy and its impact on computer cost/performance.
- Ability to understand the advantage of instruction level parallelism and pipelining for high performance Processor design.
- Ability to understand the instruction set, instruction formats and addressing modes of 8086.
- Ability to write assembly language programs to solve problems.

CS402ES: DATABASE MANAGEMENT SYSTEMS

- Demonstrate the basic elements of a relational database management system.
- Ability to identify the data models for relevant problems.
- Ability to design entity relationship model and convert entity relationship diagrams into RDBMS and formulate SQL queries on the data.
- Apply normalization for the development of application software.

CS403ES: OPERATING SYSTEMS

- Apply optimization techniques for the improvement of system performance.
- Ability to design and solve synchronization problems.
- Learn about minimization of turnaround time, waiting time and response time and also maximization of throughput by keeping CPU as busy as possible.
- Ability to change access controls to protect files.
- Ability to compare the different operating systems.

CS404ES: FORMAL LANGUAGES AND AUTOMATA THEORY

- Able to understand the concept of abstract machines and their power to recognize the languages.
- Able to employ finite state machines for modeling and solving computing problems.
- Able to design context free grammars for formal languages.
- Able to distinguish between decidability and undecidability.
- Able to gain proficiency with mathematical tools and formal methods.

SM405ES: BUSINESS ECONOMICS AND FINANCIAL ANALYSIS

The students will understand the various Forms of Business and the impact of economic variables on the Business. The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt. The Students can study the firm's financial position by analysing the Financial Statements of a Company

CS407ES: DATABASE MANAGEMENT SYSTEMS LAB

- Ability to design and implement a database schema for given problem.
- Apply the normalization techniques for development of application software to realistic problems.
- Ability to formulate queries using SQL DML/DDL/DCL commands.

CS408ES: OPERATING SYSTEMS LAB

- Ability to develop application programs using system calls in Unix.
- Ability to implement interprocess communication between two processes.
- Ability to design and solve synchronization problems.
- Ability to simulate and implement operating system concepts such as scheduling, deadlock management, file management, and memory management.

MC400HS: GENDER SENSITIZATION LAB

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature, and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labour and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

III Year

CS501PC: DESIGN AND ANALYSIS OF ALGORITHMS

- Ability to analyze the performance of algorithms.
- Ability to choose appropriate algorithm design techniques for solving problems.
- Ability to understand how the choice of data structures and the algorithm design methods impact the performance of programs.

CS502PC: DATA COMMUNICATION AND COMPUTER NETWORKS

- Students should be understand and explore the basics of Computer Networks and Various Protocols. He/She will be in a position to understand the World Wide Web concepts.
- Students will be in a position to administrate a network and flow of information further he/she can understand easily the concepts of network security, Mobile and adhoc networks.

CS503PC: SOFTWARE ENGINEERING

- Ability to identify the minimum requirements for the development of application.
- Ability to develop, maintain, efficient, reliable and cost effective software solutions
- Ability to critically thinking and evaluate assumptions and arguments.

SM504MS: FUNDAMENTALS OF MANAGEMENT

The students understand the significance of Management in their Profession. The various Management Functions like Planning, Organizing, Staffing, Leading, Motivation and Control aspects are learnt in this course. The students can explore the Management Practices in their domain area.

CS505PC: DESIGN AND ANALYSIS OF ALGORITHMS LAB

- Ability to write programs in java to solve problems using algorithm design techniques such as Divide and Conquer, Greedy, Dynamic programming, and Backtracking.

CS506PC: COMPUTER NETWORKS LAB

- Ability to understand the encryption and decryption concepts in Linux environment
- Ability to apply appropriate algorithm for the finding of shortest route.
- Ability to configure the routing table

MC500HS: PROFESSIONAL ETHICS

The students will understand the importance of Values and Ethics in their personal lives and professional careers. The students will learn the rights and responsibilities as an employee, team member and a global citizen.

CS601PC: COMPILER DESIGN

- Ability to design, develop, and implement a compiler for any language.
- Able to use lex and yacc tools for developing a scanner and a parser.
- Able to design and implement LL and LR parsers.
- Able to design algorithms to perform code optimization in order to improve the performance of a program in terms of space and time complexity.
- Ability to design algorithms to generate machine code

CS602PC: WEB TECHNOLOGIES

- Gain knowledge of client side scripting, validation of forms and AJAX programming
- Have understanding of server side scripting with PHP language
- Have understanding of what is XML and how to parse and use XML Data with Java
- To introduce Server side programming with Java Servlets and JSP

CS603PC: CRYPTOGRAPHY AND NETWORK SECURITY

- Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues.
- Ability to identify information system requirements for both of them such as client and server.
- Ability to understand the current legal issues towards information security.

CS611PE: MOBILE COMPUTING (PROFESSIONAL ELECTIVE - I)

- Able to think and develop new mobile application.
- Able to take any new technical issue related to this new paradigm and come up with a solution(s).
- Able to develop new ad hoc network applications and/or algorithms/protocols.
- Able to understand & develop any existing or new protocol related to mobile environment

CS612PE: DESIGN PATTERNS (PROFESSIONAL ELECTIVE - I)

- Create software designs that are scalable and easily maintainable
- Understand the best use of Object Oriented concepts for creating truly OOP programs
- Use creational design patterns in software design for class instantiation
- Use structural design patterns for better class and object composition
- Use behavioral patterns for better organization and communication between the objects
- Use refactoring to compose the methods for proper code packaging
- Use refactoring to better organize the class responsibilities of current code

CS613PE: ARTIFICIAL INTELLIGENCE (Professional Elective - I)

- Possess the ability to formulate an efficient problem space for a problem expressed in English.
- Possess the ability to select a search algorithm for a problem and characterize its time and space complexities.
- Possess the skill for representing knowledge using the appropriate technique
- Possess the ability to apply AI techniques to solve problems of Game Playing, Expert Systems, Machine Learning and Natural Language Processing

CS605PC: WEB TECHNOLOGIES LAB

- Use LAMP Stack for web applications
- Use Tomcat Server for Servlets and JSPs
- Write simple applications with Technologies like HTML, Javascript, AJAX, PHP, Servlets and JSPs
- Connect to Database and get results
- Parse XML files using Java (DOM and SAX parsers)

EN606HS: ADVANCED ENGLISH COMMUNICATION SKILLS LAB

- Acquire vocabulary and use it contextually
- Listen and speak effectively
- Develop proficiency in academic reading and writing
- Increase possibilities of job prospects
- Communicate confidently in formal and informal contexts

IV YEAR

CS701PC: DATA MINING

- Ability to perform the preprocessing of data and apply mining techniques on it.
- Ability to identify the association rules, classification and clusters in large data sets.
- Ability to solve real world problems in business and scientific information using data mining
- Ability to classify web pages, extracting knowledge from the web

CS702PC: PRINCIPLES OF PROGRAMMING LANGUAGES

- Ability to express syntax and semantics in formal notation.
- Ability to apply suitable programming paradigm for the application.
- Ability to compare the features of various programming languages.
- Able to understand the programming paradigms of modern programming languages.
- Able to understand the concepts of ADT and OOP.
- Ability to program in different language paradigms and evaluate their relative benefits.

CS721PE: PYTHON PROGRAMMING (PROFESSIONAL ELECTIVE –II)

- Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
- Demonstrate proficiency in handling Strings and File Systems.
- Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
- Interpret the concepts of Object-Oriented Programming as used in Python.
- Implement exemplary applications related to Network Programming, Web Services and Databases in Python.

CS723PE: WEB SCRIPTING LANGUAGES (PROFESSIONAL ELECTIVE –II)

- Comprehend the differences between typical scripting languages and typical system and application programming languages.
- Gain knowledge of the strengths and weakness of Perl, TCL and Ruby; and select an appropriate language for solving a given problem.
- Acquire programming skills in scripting language.

CS724PE: INTERNET OF THINGS (PROFESSIONAL ELECTIVE – II)

- Interpret the impact and challenges posed by IoT networks leading to new architectural models.
- Compare and contrast the deployment of smart objects and the technologies to connect them to network.
- Appraise the role of IoT protocols for efficient network communication.
- Elaborate the need for Data Analytics and Security in IoT.
- Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.

CS731PE: GRAPH THEORY (PROFESSIONAL ELECTIVE – III)

- Know some important classes of graph theoretic problems;
- Be able to formulate and prove central theorems about trees, matching, connectivity, colouring and planar graphs;
- Be able to describe and apply some basic algorithms for graphs;
- Be able to use graph theory as a modelling tool.

CS732PE: DISTRIBUTED SYSTEMS (PROFESSIONAL ELECTIVE – III)

- Able to comprehend and design a new distributed system with the desired features.
- Able to start literature survey leading to further research in any subarea.
- Able to develop new distributed applications.

CS733PE: MACHINE LEARNING (PROFESSIONAL ELECTIVE – III)

- Understand the concepts of computational intelligence like machine learning
- Ability to get the skill to apply machine learning techniques to address the real time problems in different areas
- Understand the Neural Networks and its usage in machine learning application.

CS734PE: SOFTWARE PROCESS AND PROJECT MANAGEMENT (PROFESSIONAL ELECTIVE – III)

- Gain knowledge of software economics, phases in the life cycle of software development, project organization, project control and process instrumentation
- Analyze the major and minor milestones, artifacts and metrics from management and technical perspective
- Design and develop software product using conventional and modern principles of software project management

CS741PE: COMPUTATIONAL COMPLEXITY (PROFESSIONAL ELECTIVE – IV)

- Ability to classify decision problems into appropriate complexity classes
- Ability to specify what it means to reduce one problem to another, and construct reductions for simple examples.
- Ability to classify optimization problems into appropriate approximation complexity classes
- Ability to choose appropriate data structure for the given problem
- Ability to choose and apply appropriate design method for the given problem

CS742PE: CLOUD COMPUTING (PROFESSIONAL ELECTIVE – IV)

- Ability to understand various service delivery models of a cloud computing architecture.
- Ability to understand the ways in which the cloud can be programmed and deployed.
- Understanding cloud service providers.

CS743PE: BLOCKCHAIN TECHNOLOGY (PROFESSIONAL ELECTIVE – IV)

- Learn about research advances related to one of the most popular technological areas today

CS744PE: SOCIAL NETWORK ANALYSIS (PROFESSIONAL ELECTIVE – IV)

- Develop semantic web related applications.
- Represent knowledge using ontology.
- Predict human behaviour in social web and related communities.
- Visualize social networks.

CS703PC: DATA MINING LAB

- Ability to add mining algorithms as a component to the exiting tools
- Ability to apply mining techniques for realistic data.

CS751PC: PYTHON PROGRAMMING LAB

- Student should be able to understand the basic concepts scripting and the contributions of scripting language
- Ability to explore python especially the object oriented concepts, and the built in objects of Python.
- Ability to create practical and contemporary applications such as TCP/IP network programming, Web applications, discrete event simulations

CS753PC: WEB SCRIPTING LANGUAGES LAB

- Ability to understand the differences between Scripting languages and programming languages
- Able to gain some fluency programming in Ruby, Perl, TCL

CS851PE: INFORMATION THEORY AND CODING (PROFESSIONAL ELECTIVE – V)

- Learn measurement of information and errors.
- Obtain knowledge in designing various source codes and channel codes
- Design encoders and decoders for block and cyclic codes
- Understand the significance of codes in various applications

CS852PE: REAL-TIME SYSTEMS (PROFESSIONAL ELECTIVE – V)

- Be able to explain real-time concepts such as preemptive multitasking, task priorities,
- Priority inversions, mutual exclusion, context switching, and synchronization, interrupt
- latency and response time, and semaphores.
- Able describe how a real-time operating system kernel is implemented.
- Able explain how tasks are managed.
- Explain how the real-time operating system implements time management.
- Discuss how tasks can communicate using semaphores, mailboxes, and queues.
- Be able to implement a real-time system on an embedded processor.
- Be able to work with real time operating systems like RT Linux, Vx Works, MicroC/OSII, Tiny OS

CS853PE: DATA ANALYTICS (PROFESSIONAL ELECTIVE – V)

- Understand the impact of data analytics for business decisions and strategy
- Carry out data analysis/statistical analysis
- To carry out standard data visualization and formal inference procedures
- Design Data Architecture
- Understand various Data Sources

CS861PE: ADVANCED ALGORITHMS (PROFESSIONAL ELECTIVE – VI)

- Ability to analyze the performance of algorithms.
- Ability to choose appropriate data structures and algorithm design methods for a specified application.
- Ability to understand how the choice of data structures and the algorithm design methods impact the performance of programs.

CS863PE: COMPUTER FORENSICS (PROFESSIONAL ELECTIVE – VI)

- Students will understand the usage of computers in forensic, and how to use various forensic tools for a wide variety of investigations.
- It gives an opportunity to students to continue their zeal in research in computer forensics

CS864PE: NEURAL NETWORKS & DEEP LEARNING (PROFESSIONAL ELECTIVE – VI)

- Ability to understand the concepts of Neural Networks
- Ability to select the Learning Networks in modeling real world systems
- Ability to use an efficient algorithm for Deep Models
- Ability to apply optimization strategies for large scale applications